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Methodology of Scientific Research: The Algorithm for the Formation of the Problem and the Stages of its Study

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The current article is aimed at the novice scholars whose intention is to commence the dissertation research work. Moreover, in the article, methodological recommendations on the process, ranging from the formation of dissertation problem to comprehension of its essence and finding solutions are provided. Particularly, algorithms, originated by author which are supposed to be followed in performing these actions, have been presented.

At the initial stage of scientific research, the existing practical problem (within the framework of chosen subject of scientific research) is identified and it is transformed into 'scientific problem'. That is, the need to scientific solution of this practical problem and the fact that it was not previously given a scientific solution, is proved.

- **The problem** is the discrepancy between the ideal state (set goal) and the current state (the larger the gap is, the more compatible the coverage of the problem will be).

- **A scientific problem** is a form of scientific reflection of a problem, that is, the absence or insufficient formation of a scientific basis for solving this problem, the absence of scientifically based recommendations for solving the problem (it is reflected as a need to identify the factors that cause existing contradictions in a particular area and find their solution).

Today, there are various interpretations of the problem itself.

According to R.Dilts, the problem is a process, an interconnection, and cannot be reflected in a single object or period [1].

It should be noted, the **"ideal situation",** mentioned in the definition of the problem, changes to meet modern requirements.

So, according to K.Popper, science starts with problrms, not observations, although observations can create a problrm if they are unexpected, that is, if they come into collision with our expectations or theories. Also, as he noted, the successful solution of a scientific problem depends on the following factors (conditions):

- forming the problem specifically (concretely) and accurately;
- to find different solutions to this problem, critical analysis and controversy are necessary [2].

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In the process of carrying out the scientific research work, based on the above definitions, initially it is necessary to formulate a **practical problem**, and on its basis a **scientific problem**.

Not every problem could be scientific problem. Scientific problems are distinguished from the rest of the types of problems by the fact that they are laid on the basis of scientific foundations and are studied mainly with the help of scientific methods in order to expand scientific knowledge.

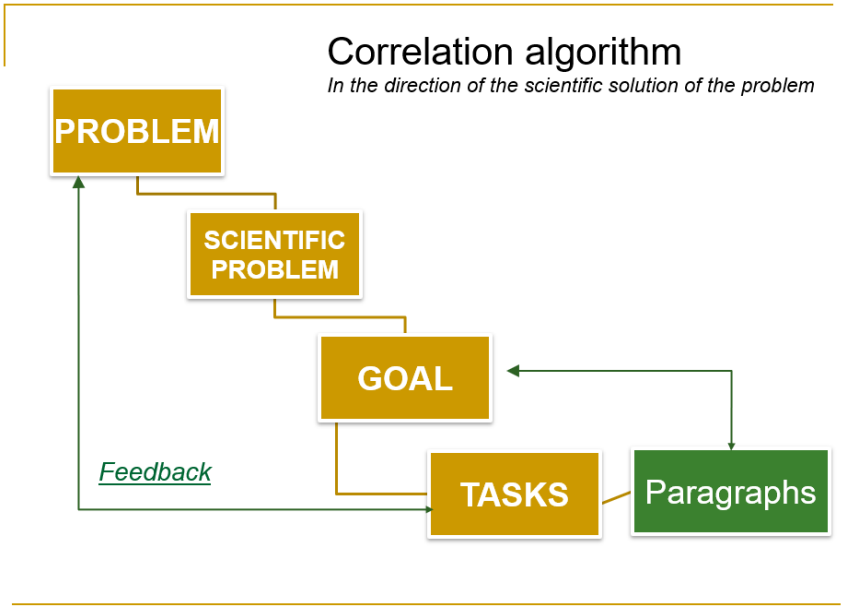
The tradition of posing a scientific problem goes back to I. Newton, who argued that a scientist should correctly ask nature questions and then nature will answer him correctly [3].

At first glance, the problems seem to be one-sided, but in the process of finding a solution to the problem, it becomes noticeable that it is comprehensive. *The solution to the problem is carried out by disassembling it, that is, finding solutions to private problems. They are concentrated around the main problem, which has the characteristic of connecting, identifying, finalizing any private problems*. Solving such private problems provides the researcher with information, data and evidence in search of a solution to the main problem.

Taking into account the aforementioned points, the following views can be mentioned related to the problem and scientific problem in the procedure of doing the scientific research:

- a scientific problem arises in cases where there is no scientific solution to a practical problem or the existing solution does not bring the desired result;
- it is also possible to formulate several scientific problems from one practical problem, from within these scientific problems, the relevance of the research topic is checked by feedback when choosing the most optimal one.

Hence, a scientific problem is developed on the basis of a practical problem, and out of a scientific problem a target is developed. To achieve the goal of scientific research, appropriate tasks are developed accordingly, and this process needs to be carried out on the basis of the requirements of the **correlation algorithm** (Graphic 1).



Graphic 1. Correlation algorithm for finding a scientific solution to the problem (worked out by the author)

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Sample

The problem: The high level of the negative impact of "popular culture" on the Society of the country.

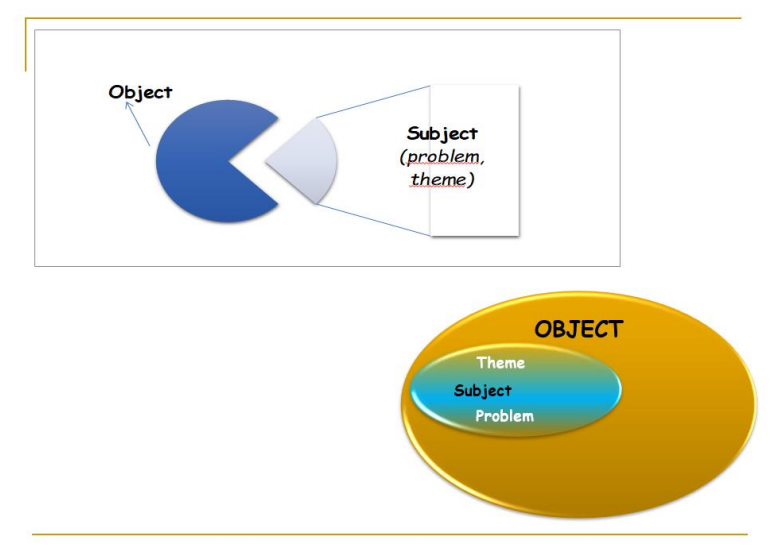
The scientific problem: the lack of a form of methodology for assessing the threats of cultural expansion.

The purpose of the research: indicators that determine the threats of cultural expansion and the fact that their lower limits are not defined.

Each of them should not deviate from the scope of the research **Object**, having a close relationship between the selected **Theme**, **Practical problem**, **Scientific problem** and **Subject**.

There are the following principles of ensuring the relationship between these elements of the research program:

- ensuring that the object covers the theme, problem and subject, that is, the them, problem and subject must lie "inside" the object;
- ensure that the object's coverage is level higher than the theme (subject);
- ensuring that the them, problem and subject are formed in mutual harmony, close to each other (Graphic 2).



Graphic 2. **Correlation between object, theme, problem and subject**

(worked out by the author)

In order to gain a general picture of the problem during the research, the following is considered to be done:

- searching for the main problem (Table 1);
- extracting the problem from the problem situation, determining its boundaries;
- decomposing the main problem of the study, dividing it into known or unknown, systemic or specific problems, important or non-essential;

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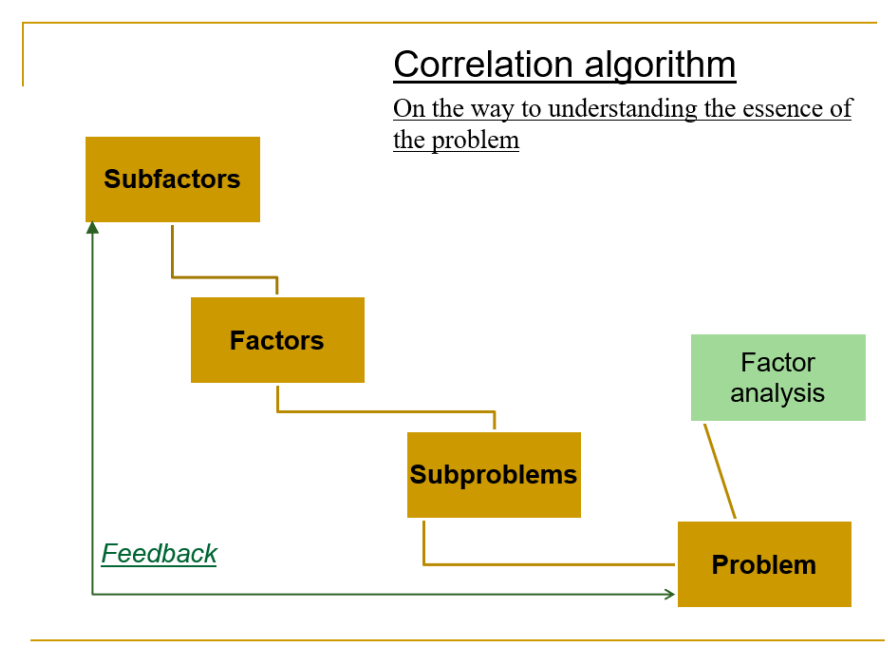
- understanding the essence of the problem by identifying the subproblems of the problem as well as the factors affecting the problem (Graphic 3);
- identifying the consequences of the problem, in particular the risks, risks and threats that may arise due to the fact that the problem is maintained or not eliminated in time;
- finding a solution to the problem, it is necessary to establish the main tasks, to study these tasks, ensuring that they are reflected in paragraphs;
- providing a connection between understanding the essence of the problem and algorithms for finding a scientific solution.

Table 1. The process of searching for the main problem

The aspect of the domain where there is a problem	Directions	Quantitative and qualitative analysis
Ҳуқуқий-меъёрий асос Legal-regulatory framework	International	Availability
		Quality
	National	Availability
		Quality
	Local	Availability
		Quality
Институционал асос Institutional framework	International	Availability
		Quality
	National	Availability
		Quality
	Local	Availability
		Quality



Graphic 3. Algorithm for understanding the essence of the problem

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To find the main problem, to understand its essence and scale, it is necessary, first of all, to conduct a quantitative and qualitative analysis.

The following sample presents a method for identifying problems in the field of transport based on quantitative indicators (indicators) (example).

Sample

Problems with transport corridors of international importance

Sector/ direction	Indicators	International norm	Current indicators
Corridors of international importance	Capacity	> 10 million tons	**5 million tons** *(rate reduction by 50%)*
	Road quality	Category I and II roads	**15%** (compared to total roads)
Infrastructure	Availability of service of logistics centers	1 piece per 100 km	**300 km / 1 unit** (30% of the norm)
	The cost of transporting 1 ton of cargo per 1 km	< 1 $	**1,95 $** (almost 2 times more expensive)

In general, the process of decomposing a problem requires a creative approach from each researcher. At the same time, the above principles, requirements and conditions should not be forgotten.

In particular, the specificity of the algorithm for studying the problem is that the scientific actions presented above should be performed in a logical sequence. The application of these methodological requirements in their work is an important step for the effective completion of the research.

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